XC-ES50L/ES50LCE

1/2 Type CCD | C Lens Mount | VS Output | HD VD External Sync | Normal Shutter | Mode 1 (Non-Reset Mode) External Trigger Shutter | Mode 2 (Non-Reset Mode) External Trigger Shutter | Restart Reset | Long Exposure | L Type | Lead-Free Solder

Connection Diagram P59

Outline

The XC-ES50L/ES50LCE is a monochrome video camera module with a 1/2 type CCD for industrial use.
Like the XC-ES50/ES50CE, this model provides various mode switches on the rear panel, making it ideal for use in combination with other industrial equipment.

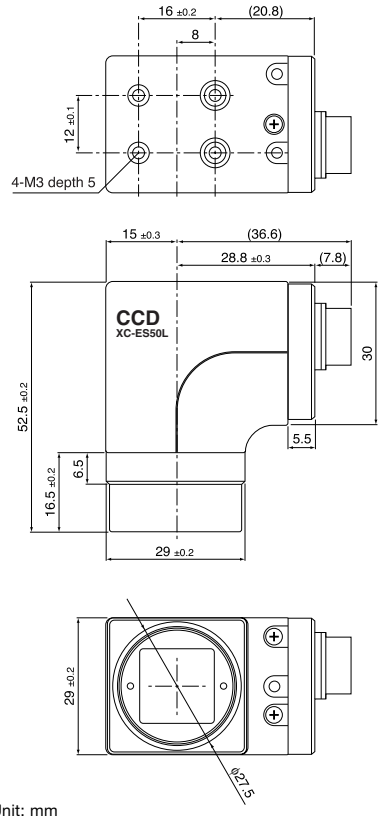
Features

- XC-ES50L/ES50LCE: 1/2 type interline CCD
- High S/N ratio: 60 dB
- Electronic shutter function (1/100 to 1/10,000 sec.)
- External trigger shutter function (1/4 to 1/10,000 sec.)
- 2:1 Interlaced/non-interlaced
- Frame/field accumulation
- Restart/reset function
- IR cut filter
- Sync system: Internal/external (HD/VD)
- High shock and vibration resistance

Accessories

- Compact camera adaptor
  - ●DC-700/700CE
- 12-pin camera cable (CE standard)
  - ●CCXC-12P02N (2 m)
  - ●CCXC-12P05N (5 m)
  - ●CCXC-12P10N (10 m)
  - ●CCXC-12P25N (25 m)
- C-mount lens
  - ●VCL-08YM
  - ●VCL-12YM
  - ●VCL-16Y-M
  - ●VCL-25Y-M
  - ●VCL-50Y-M

Dimensions



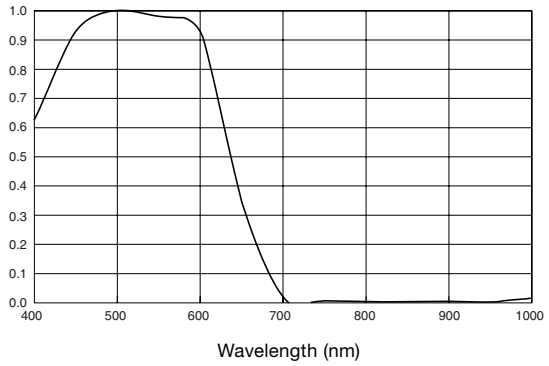
Unit: mm

Spectral Sensitivity Characteristics

●XC-ES50L/XC-ES50LCE

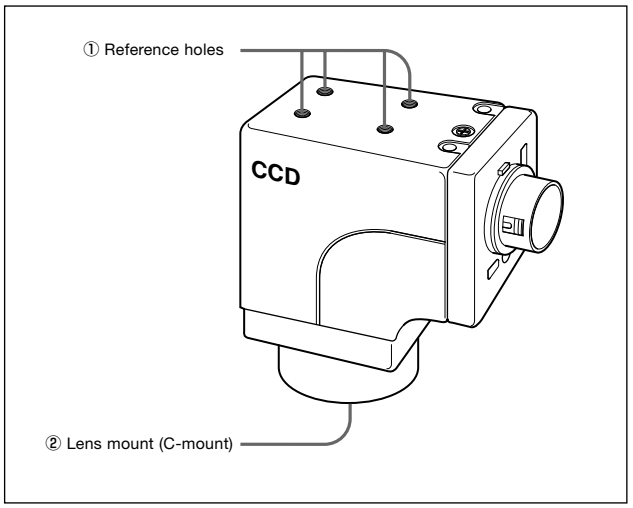
(Typical Values)

Relative sensitivity



(Lens characteristics included, and light source characteristics excluded.)

Location and Function of Parts and Controls



① Reference holes

These precision screw holes are for locking the camera module.

② Lens mount (C-mount)

Attach the VCL-50Y-M C-mount lens or other optical equipment.

Note

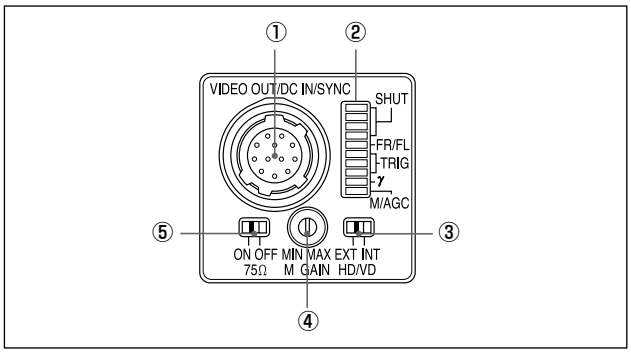
The lens must not project more than 7 mm from the lens mount.

Specifications

	XC-ES50L	XC-ES50LCE
Image device	1/2 type IT CCD	
Signal system	EIA	CCIR
Effective picture elements	768 (H) x 494 (V)	752 (H) x 582 (V)
Effective lines	752 (H) x 485 (V)	736 (H) x 575 (V)
Horizontal frequency	15.734 kHz	15.625 kHz
Vertical frequency	59.94 Hz	50 Hz
Lens mount	C mount	
Sync system	Internal/External (auto)	
External sync system input/output*1	HD/VD (HD/VD level: 2 to 5 Vp-p)	
External sync frequency	±1 % (in horizontal sync frequency)	
H Jitter	less than ±20 nsec	
Scanning system	525 lines 2:1 Interlaced (Automatic switching according to input signal)	625 lines 2:1 Interlaced (Automatic switching according to input signal)
Video output	1.0 Vp-p, negative, 75 Ω unbalanced	
Horizontal resolution	570 TV lines	560 TV lines
Sensitivity	400 lx F4 (γ=ON, MIN GAIN, IR cut filter)	
Minimum illumination	3.0 lx	
S/N ratio	60 dB	
Gain	AGC/Manual (adjustable on the rear panel)	
Gamma	ON/OFF (adjustable on the rear panel)	
Normal shutter	1/100 to 1/10,000 s	1/120 to 1/10,000 s
External trigger shutter*2	1/4 to 1/10,000 s	1/4 to 1/8,000 s
Power requirements	DC 12 V (+9 to16 V)	
Power consumtion	1.6 W	
Dimension (W) x (H) x (D)	29 x 42.5 x 43.8 mm	
Mass	110 g	
Operation temp. / humidity	-5 ˚C to +45 ˚C / 20 to 80 % (no condensation)	
Storage temp. / humidity	-20 ˚C to +60 ˚C / 20 to 95 % (no condensation)	
Vibration resistance	10 G (20 to 200 Hz in X,Y,Z directions)	
Shock resistance	70 G	
MTBF	126,469 hrs.	
Regulatory compliance	UL1492, FCC Class B Digital Device, CE (EN61326/97 + A1/98), Australia EMC (AS4251.1+A4252.1)	
Supplied accessories	Lens mount cap (1), Operating instructions (1)	

*1 Automatic switching in response to the presence of an input signal when the switch on the rear panel is set to EXT.
*2 Using Dip switch on the rear panel or Using trigger pulse width

Rear Panel



Note

Be sure to turn the power off before making switch settings. As the variable controller for manual adjustment is a small precise component, do not apply force more than required when adjusting. Doing so will break the component. The controller is not a 360-degree rotation type. Do not turn the controller beyond the stopper of the component. The range of rotation is about 260 degrees. For the adjustment of the variable controller, use a flathead screwdriver. The sizes of a recommended flathead screwdrivers are 1.9mm width, 0.5mm thickness and more than 0.45mm length.

① **Video out/DC IN/SYNC (video output/DC power input/ sync signal I/O) connector (12-pin)**
Connect a CCXC-12P05N camera cable to this connector for the +12V DC power supply and the video signal output from the camera module. When a sync signal generator is connected to this connector, the camera module is synchronized with the external sync signals (HD/VD signals).

② **Shutter speed/Mode setting DIP switch**

Shutter speed (bits 1 to 4)
Set an appropriate shutter speed. (Factory setting: OFF)

Potential accumulation mode (bit 5):
(Factory setting: FRAME)

Restart reset/External trigger shutter mode switch (bits 6–8):
(Factory setting: Normal)

γ compensation ON/OFF switch (bit 9):
Turn on this switch to enable the g compensation.
(Factory setting: OFF)

GAIN switch (bit 0):
This switch selects MGC (manual adjustment) or AGC (automatic adjustment). (Factory setting: MGC)

③ **HD/VD signal input/output switch**
Set the switch to INT to output HD/VD signals from the camera module.Set the switch to EXT to input HD/VD signals from an external unit. (Factory setting: EXT)

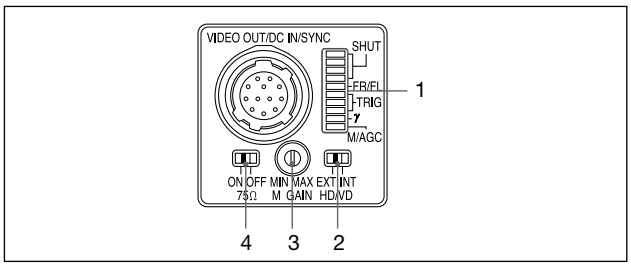
④ **Manual GAIN (M GAIN) control knob**
If you have selected MGC with the GAIN switch (DIP switch ②), this knob adjusts the gain. (Factory setting: twelve o'clock position)

Note

If you have selected FRAME using the Potential accumulation mode (DIP switch ②), set this knob to MAX.
(This is due to requirement CCD.)

⑤ **75Ω termination switch**
Turn this to OFF when not terminated. (Factory setting: ON)

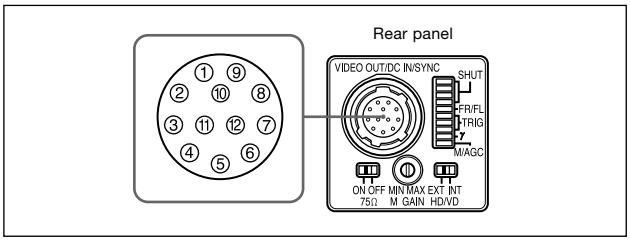
Factory Mode Settings of Rear Panel



Number	Switch name		Factory mode setting
1	Shutter speed/ Mode setting DIP switch	Shutter speed (bits 1 to 4)	OFF
		Potential accumulation mode (bit 5)	FRAME
		Restart reset/External trigger shutter mode switch (bits 6 to 8)	Normal
		γ compensation ON/OFF switch (bit 9)	OFF
		GAIN switch (bit 0)	MGC
2	HD/VD signal input/output switch		EXT
3	Manual GAIN (M GAIN) control knob		twelve o'clock position*
4	75 Ω termination switch		ON

* When the GAIN switch is set to "MGC" (Manual), you can change the gain level in a range from 0 to 18 dB.

Connector Pin Assignments



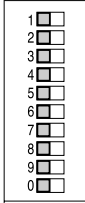
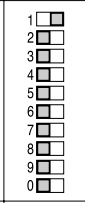
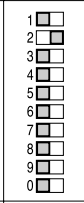
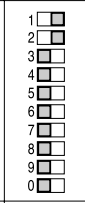
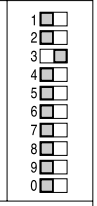
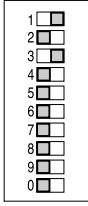
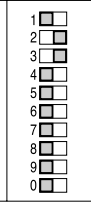
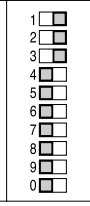
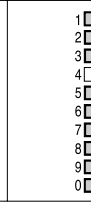
Pin No.	Camera sync output	External mode (HD/VD)	Restart/Reset	External trigger shutter
1	Ground	Ground	Ground	Ground
2	+12V DC	+12V DC	+12V DC	+12V DC
3	Video output (Ground)	Video output (Ground)	Video output (Ground)	Video output (Ground)
4	Video output (Signal)	Video output (Signal)	Video output (Signal)	Video output (Signal)
5	HD output (Ground)	HD input (Ground)	HD input (Ground)	HD input (Ground)
6	HD output (Signal)	HD input (Signal)	HD input (Signal)	HD input (Signal)
7	VD output (Signal)	VD input (Signal)	Reset (Signal)	VD input (Signal)
8	—	—	—	—
9	—	—	—	—
10	—	—	—	WEN output (Signal)
11	—	—	—	Trigger pulse input (Signal)
12	VD output (Ground)	VD input (Ground)	Reset (Ground)	Reset (Ground)

Normal Shutter

This mode provides continuous video output with the electronic shutter selected by switches to capture a high-speed moving object clearly.

Setting of the Normal Shutter

●**Using the DIP switches on the rear panel**

Shutter OFF	1/125	1/250	1/500	1/1000
				
1/2000	1/4000	1/10000	Flickerless* (EIA: 1/100 CCIR: 1/120)	
				

(Unit: second)

* If you set the mode to flickerless, the positions of DIP switches 1 to 3 are optional.

Note

- The positions of DIP switches 6 and 7 are optional.
- The DIP switch 5 position is optional. (The field setting is recommended.) The field setting can obtain a sensitivity that is twice that of the frame setting.

External Trigger Shutter

By inputting an external trigger pulse, the camera is able to capture fast-moving objects clearly.
Set DIP switches 6, 7, and 8 on the rear panel to Mode 1 or Mode 2 (See the table below).
When you set the trigger pulse width to 1/3 of a second or more, the output signal changes to the normal VIDEO signal.
There are two modes for timing in which a video signal is obtained.

●Mode 1 (Non-reset mode)

In this mode, a video signal synchronized with a VD signal is output after a trigger pulse is input.

– A video signal is synchronized with the external VD signal when an external HD/VD signal is input.
– A video signal is synchronized with an internal VD signal when no external HD/VD signal is input.

●Mode 2 (Reset mode)

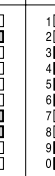
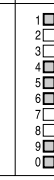
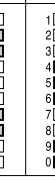
In this mode, an internal VD is reset, then an internal video signal is output after trigger pulse input after a certain period of time.

Setting of the External Trigger Shutter

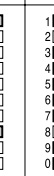
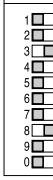
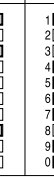
You can set the shutter speed with the DIP switches or using the trigger pulse width.

●Using the DIP switches on the rear panel

Mode 1 (Non-reset mode)

1/100 (EIA)* 1/120 (CCIR)*	1/125	1/250	1/500
			
1/1000	1/2000	1/4000	1/10000 (EIA) 1/8000 (CCIR)
			

Mode 2 (Reset mode)

1/100 (EIA)* 1/120 (CCIR)*	1/125	1/250	1/500
			
1/1000	1/2000	1/4000	1/10000 (EIA) 1/8000 (CCIR)
			

(Unit: second) (Unit: second)

* If 1/100 (EIA) or 1/120 (CCIR) has been set, the positions of DIP switches 1 to 3 are optional.

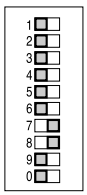
Note

The positions of DIP switches 5, 9 and 0 are optional.

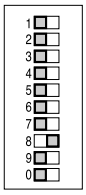
●Setting the external shutter speed with the trigger pulse width

Set all DIP switches (1 to 4 on the rear panel) to 0.
You can obtain an arbitrary shutter speed by setting the trigger pulse width to the range of 2 µsec to 250 msec.

Mode 1 (Non-reset mode)



Mode 2 (Reset mode)

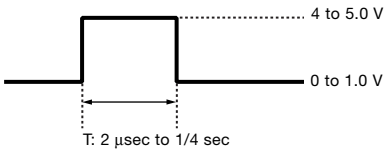


Exposure time = Trigger pulse width + 97 µsec (EIA)
Trigger pulse width + 120 µsec (CCIR)

Note

- The DIP switch 5 position is optional. (The field setting is recommended.) The field setting can obtain a sensitivity that is twice that of the frame setting.
- An image is not output correctly when the next trigger is input before the image for the previous trigger is output.

●Specifications of the Trigger Pulse



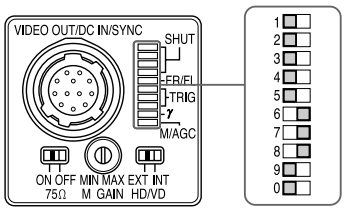
T: If you set the trigger pulse with the DIP switches, use the 100 µs to 1/4 sec pulse width.

- Input impedance; 10 kΩ or more.
- The voltage and pulse width used are measured at pin 11 of a 12-pin multi-connector on the rear panel.

Restart/Reset

To set Restart/Reset mode

The information on one screen can be extracted at any time by externally inputting a restart/reset signal (HD/VD). To enter this mode, set DIP switches 6, 7, and 8 on the rear panel of the camera as shown in the figure below. The setting is especially effective for the operation explained below.



Long Exposure

The Restart/Reset function extends the CCD accumulation time, resulting in a highly sensitive image. This function is effective when you cannot gain satisfactory sensitivity under normal operating conditions, or when you want to observe a moving object. Extend the VD interval (T) period between external VD pulses.

Note

Some white spots may appear after a long exposure.

Sample input timing chart 1